OSD DT&E Perspective: Technology Development and Maturation

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Outline

- SSE Mission
- Systems Engineering Revitalization
- Emerging Systemic Issues
- DT&E Revitalization Focus
- DT&E Technology Maturity Initiative
- Pending Guidance Changes

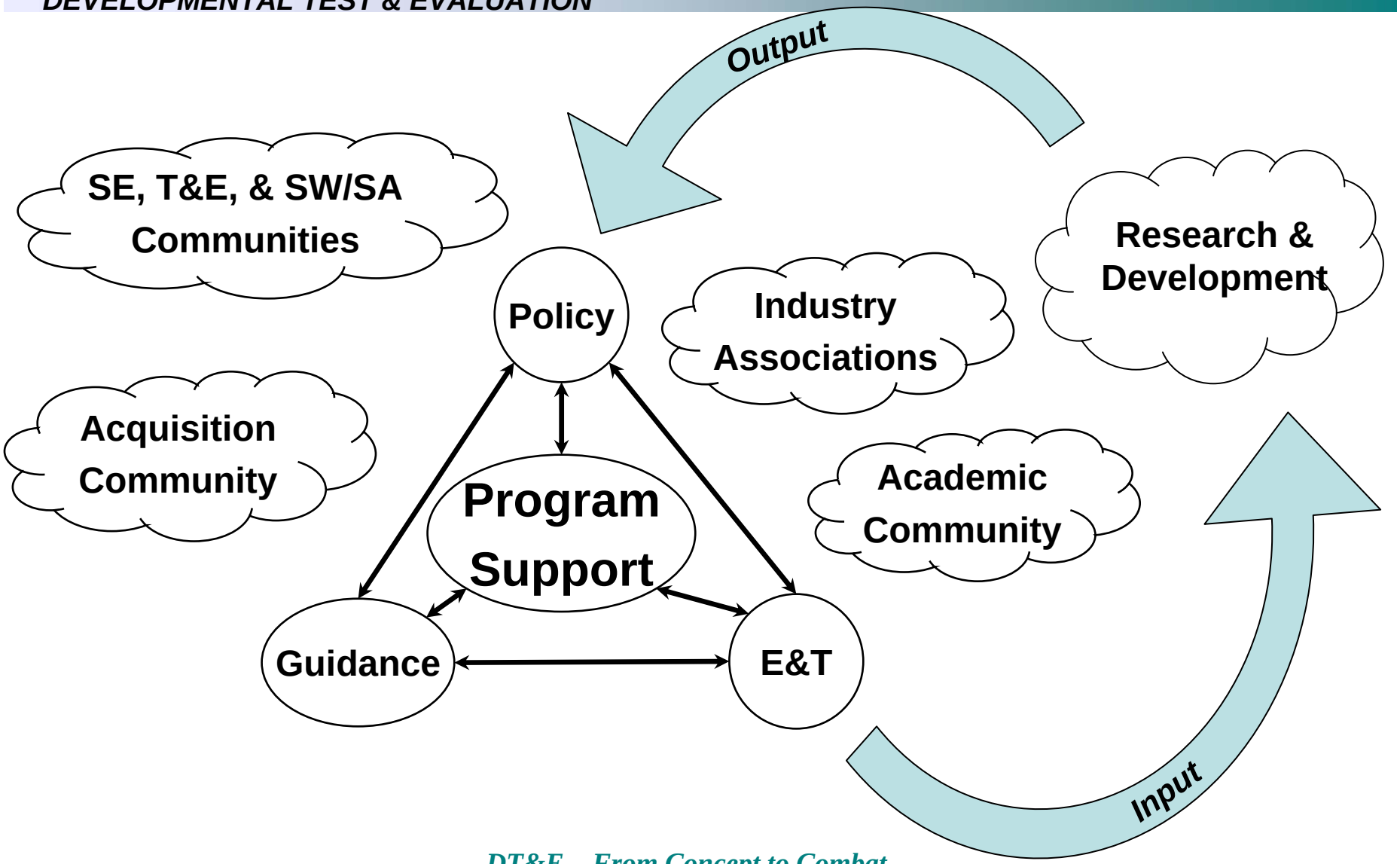
Systems and Software Engineering
Mission Statement

DEVELOPMENTAL TEST & EVALUATION

- Shape acquisition solutions and promote early technical planning
- Promote the application of sound systems and software engineering, developmental test and evaluation, and related technical disciplines across the Department's acquisition community and programs
- Raise awareness of the importance of effective systems engineering and drive the state-of-the-practice into program planning and execution
- Establish policy, guidance, best practices, education, and training in collaboration with academia, industry, and government communities
- Provide technical insight to program managers and leadership to support decision making

Evolving System Engineering Challenges

Systems Engineering Revitalization Cycle



Top 10 Emerging Systemic Issues

DEVELOPMENTAL TEST & EVALUATION

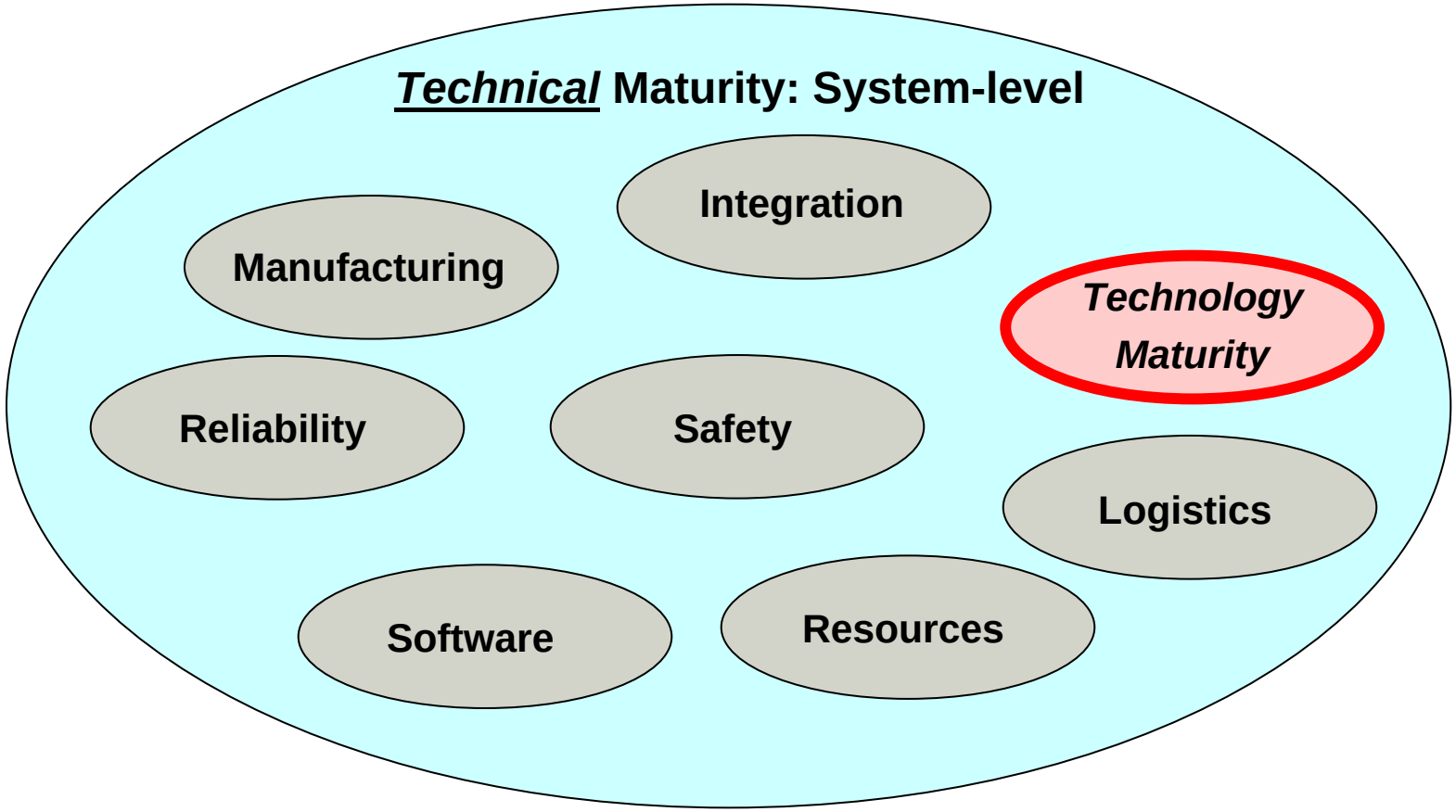
1. Management	• **IPT roles, responsibilities, authority, poor communication** • **Inexperienced staff, lack of technical expertise**
2. Requirements	• **Creep/stability** • **Tangible, measurable, testable**
3. Systems Engineering	• **Lack of a rigorous approach, technical expertise** • **Process compliance**
4. Staffing	• **Inadequate Government program office staff**
5. Reliability	• **Ambitious growth curves, unrealistic requirements** • **Inadequate "test time" for statistical calculations**
6. Acquisition Strategy	• **Competing budget priorities, schedule-driven** • **Contracting issues, poor technical assumptions**
7. Schedule	• **Realism, compression**
8. Test Planning	• **Breadth, depth, resources**
9. Software	• **Architecture, design/development discipline** • **Staffing/skill levels, organizational competency (process)**
10. Maintainability/Logistics	• **Sustainment costs not fully considered (short-sighted)** • **Supportability considerations traded**

Major contributors to poor program performance

DT&E Revitalization Focus

- Support Faster Fielding of Improved Capabilities
- **Reduce Risk of Immature Technology in Systems Development**
- Revitalize T&E Workforce Education
- Promote Joint T&E in Live-Virtual-Constructive Environments
- Provide Effective Acquisition Policy and Practices for DT&E

Technology vs. Technical Maturity



Technology Maturity is a component- or subsystem-level issue

Reduce Risk of Immature Technology in Systems Development

- **Immature technology is a primary source of cost and schedule risk**
  - **GAO -- DAPA**
  - **QDR -- SSE/AS Program Support Reviews**

- **"Programs that started development with immature technologies experienced an average acquisition unit cost increase of nearly 21 percent" (GAO-05-301, March 2005)**

- **Milestone B – USD(AT&L) certification that *"the technology in the program has been demonstrated in a relevant environment"* - Technology Readiness Level (TRL) 6 (FY06, PL 109-163, Section 801)**

DT&E Technology Maturity Initiative

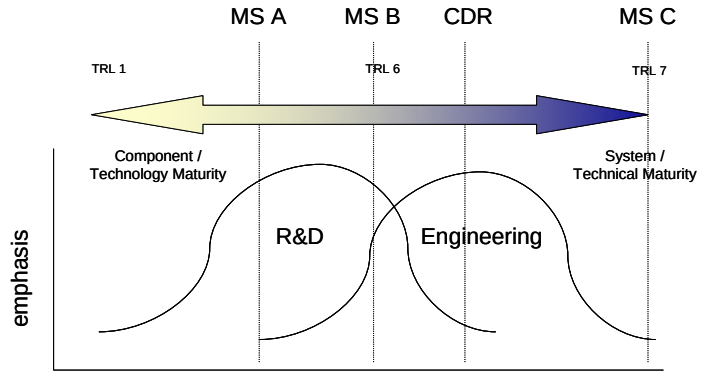
DEVELOPMENTAL TEST & EVALUATION

Purpose

- Add Technology Maturity focus into the Systems Engineering and DT&E processes to:
  - Reduce technical, cost, and schedule risk
  - Increase the rigor of SE
  - Plan for alternatives in the event of TM difficulty
  - Verify TRLs during DT&E

Scope

- Leverage existing acquisition review structure
- Use existing DDR&E Technology Readiness Assessment (TRA) methodology



Pending Guidance Changes

- Defense Acquisition Guidebook
  - Chapter 4 (SE)
    - For immature enabling/critical technology, identify mature alternative
    - If enabling/critical component is not likely to reach TRL 6 before MS B, substitution of the mature alternative may be required
  - Chapter 9 (T&E)
    - Validate technology maturation during Technology Development phase
      - DT supports decisions to shift to alternative technology

Increased TM emphasis in OSD Oversight

- Program Support Review (PSR)
  - ID Critical Technology components/sub-systems?
  - Current TRLs known?
  - ID Mature alternative components/sub-systems?
  - TRL monitoring, Alternative decision date?
- Assessment of Operational Test Readiness (AOTR)
  - TM verification results
  - DT&E performance results
  - IOT&E predictive analysis/M&S